Olin Chemicals Skill Check

Sump Agitator (Chemineer) Overhaul

Trainee: _____ **Date:** _____

Examiner: _____ **Results** (check one)**:** ❑ **Pass** ❑ **Fail**

Task Statement

Sump Agitator (Chemineer) Overhaul

Performance Conditions

Setting: Shop.

Tools:
Inside and Outside Micrometers
Combination Square
Feeler Gauges
Scribe
Scale
Files (Assorted)
Gasket Cutter
Screw Drivers
Allen Wrenches
Combination Wrenches
Channel Locks
Crescent Wrenches
Pliers (Assorted)
Socket Set
Pipe Wrench
Wedges

Equipment:
1/2 Ton Chain Fall
1/2 Ton Come-Along
Arbor Press
Bearing Heater
Drill Press
Laser Alignment
Dial Indicator and Attachments
Pneumatic Buffer/Grinder
Bead Blaster (Pneumatic)
Parts Washer
Vice
Impact Wrench (Pneumatic)
Eye Protection:
    Safety Glasses
Gloves:
    Cotton
Respiratory Protection:
    Positive Pressure Mask
Protective Clothing:
    Nomex Coveralls
Ear Plugs

Materials:
Anti-Seize Compound
Gasket Material
Lubricant (Grease and/or Oil)
New Bearings
New Oil Seals
New Mechanical Seal
LCC-1013 Safe Work Permit Procedure
LCC-1005 Hazardous Energy Tag & Lockout Procedure
LCC-1005B Line Breaking, Vessel & Equipment Opening Procedure
Vendor Manual

Attainment Standards

Do 100% of all procedural steps and standards, without assistance, within a 5 hour time period, following all safety procedures and permits.

Trainee Directions

The above referenced tools, equipment, materials, and supplies will be used to safely disassemble, inspect, repair, and reassemble the Chemineer sump agitator. All shop safety procedures must be followed. Both the process and the final result will be evaluated by the examiner. Steps must be performed in the proper sequence, and all steps must meet the standards for successful completion of this skill check.

Administration Instruction

Examiner directions: The trainee is to demonstrate the ability to safely disassemble, inspect, repair, and reassemble the Chemineer sump agitator. The procedure must meet the standards as referenced.

Prior to the skill check, ensure that all referenced equipment and supplies are available. Do not provide assistance during the skill check, but monitor the progress and prevent personal injury or damage to the equipment. After the skill check, feel free to add suggestions and observations in the comments section on the last page.

Scoring procedures: Observe the trainee's performance on each task element/step and mark the checklist whether or not the standard was attained. Task elements/steps in the process are to be marked as they are observed. *Do not rely on your memory.*

Checklist

Task: Sump Agitator (Chemineer) Overhaul

(S) Important sequence. This step must be performed only after preceding steps.

(C) Critical steps. Failure to meet standards for this step results in skill check failure.

CHECKLIST for TRAINEE/EXAMINER

ELEMENTS/STEPS	STANDARDS	Yes	No
PROCESS			
1. Obtain Safe Work Permit. **(C)**	Procedure LCC 1013 followed for obtaining the Safe Work Permit.	❑	❑
2. Interview the Operator for additional information. **(C)** **(S)**	Operator questioned concerning:		
	vibration.	❑	❑
	overheating.	❑	❑
	abnormal sounds.	❑	❑
	suction/discharge.	❑	❑
3. Lock, Tag out, & Disconnect all connected energy sources. **(C)** **(S)**	Procedure LCC 1005 followed.	❑	❑
	Pump was isolated and depressurized.	❑	❑
4. Sign on the Safe Work Permit with the assigned unit Operator. **(C)** **(S)**	Maintenance and Operation personnel signed the Safe Work Permit in accordance with LCC 1013.	❑	❑
5. Determine, with the Operator, the decontamination requirements. **(C)** **(S)**	Planned for:		
	residue removal.	❑	❑
	need for product storage can.	❑	❑
	containment of overspill.	❑	❑
	hazardous gas release.	❑	❑
6. Inspect gear box, motor, and surrounding area for abnormal conditions. **(C)** **(S)**	Inspected for:		
	leaking gear box.	❑	❑
	noise/vibration coming from adjacent equipment.	❑	❑
	pipe support stress.	❑	❑

	ELEMENTS/STEPS	STANDARDS	Yes	No
7.	Record all inspection or measurement data on either Tear Down or Build Up Report. **(S)**	Documented inspection and measurement results during the disassembly.	❑	❑
8.	Remove coupling guard. **(S)**	Bolts removed.	❑	❑
		Pedestal guard removed and secured.	❑	❑
		Bolts are bagged and tagged/labeled.	❑	❑
9.	Uncouple motor from gear reducer. **(S)**	Match mark the coupling halves.	❑	❑
		Removed hub bolts to coupling flange.	❑	❑
		Removed flange and sleeve assembly.	❑	❑
		Separated the flanges from sleeve.	❑	❑
		Used appropriate tools.	❑	❑
		Fasteners are bagged and tagged.	❑	❑
10.	Inspect coupling assembly. **(C)** **(S)**	Visually inspects for:		
		missing fasteners.	❑	❑
		cracks.	❑	❑
		worn sleeve.	❑	❑
		Records the coupling gap.	❑	❑
		Documented inspection results.	❑	❑
11.	Measure motor shaft lift, thrust, and run out. **(C)** **(S)**	Shaft checked with dial indicator for lift ≤.002”.	❑	❑
		Shaft checked with dial indicator for axial movement ≤.002”.	❑	❑
		Shaft checked with dial indicator for radial runoout ≤ .004” TIR.	❑	❑
		Demonstrated the proper use/care of precision measuring tools.	❑	❑
		Documented measurement results.	❑	❑
12.	Measure shaft and shaft keyway **(S)**	Two measurements with micrometer/caliper taken on shaft at 90° apart.	❑	❑
		Keyway depth, width, and length measured.	❑	❑

ELEMENTS/STEPS	STANDARDS	Yes	No
13. Unbolt the mounting flange from the sump foundation. **(S)**	Bolts removed using the appropriate tools.	❑	❑
	Bolts inspected for:		
	galling.	❑	❑
	stripping.	❑	❑
	nicks.	❑	❑
	dents.	❑	❑
	flattened threads.	❑	❑
	Bolts are bagged and tagged/labeled.	❑	❑
14. Remove the gear reducer and pedestal assembly from the sump foundation. **(S)**	Removed the fasteners.	❑	❑
15. Remove the propeller assembly from the shaft. **(S)**	Shaft key set screw backed off.	❑	❑
	Propeller tapped off shaft using a softener	❑	❑
16. Transport the agitator components to the shop. **(S)**	Rigging attached to the assembly (if required).	❑	❑
	Shackle(s) attached to lifting equipment (if required).	❑	❑
	Assembly safely transported by crane/truck/wagon.	❑	❑
17. Drain the oil from the reservior. **(S)**	Removed drain plug/piping.	❑	❑
	Drained oil into containment oil can.	❑	❑
	Drained oil without excessive spillage.	❑	❑
	Cleaned any excess oil within drain area.		
	Used proper oil waste disposal technique.		
18. Loosen the pedestal/bearing set screw on the shaft. **(S)**	Flange set screws are loosened	❑	❑
19. Remove the gear reducer and shaft from the pedestal. **(S)**	Pedestal fasteners removed.	❑	❑

ELEMENTS/STEPS	STANDARDS	Yes	No
20. Remove the shaft from the gear reducer. **(S)**	Stub shaft removed.	❑	❑
21. Measure the shaft runout. **(S)**	Used V-blocks and dial indicator to check shaft straightness.	❑	❑
22. Measure the shaft ends **(S)**	Two measurements with micrometer/caliper taken on shaft at 90° apart.	❑	❑
23. Measure the bearing surfaces **(S)**	Two measurements with micrometer/caliper taken on shaft bearing surface at 90° apart.	❑	❑
	Bearing housing ID measured with snap gauge and micrometer.	❑	❑
	Demonstrated the proper use/care of precision measuring tools.	❑	❑
	Documented measurement results.	❑	❑
24. Remove the mounting flange from the pedestal. **(S)**	Mounting flange bolts removed.	❑	❑
25. Remove the bearing from the mounting flange. **(S)**	Used arbor press on the shaft bearing following appropriate safety precautions:		
	safety glasses/face shield/gloves.	❑	❑
	proper placement of pusher.	❑	❑
	Protected the pressed surface.	❑	❑
26. Apply a lubricant to a new bearing. **(S)**	Ensured bearing is clean.	❑	❑
	Applied the proper type of lubricant.	❑	❑
27. Installed a new bearing to the mounting flange **(S)**	Used arbor press on the shaft bearing following appropriate safety precautions:	❑	❑
	safety glasses/face shield/gloves.	❑	❑
	proper placement of pusher.	❑	❑
	Protected the pressed surface.		

ELEMENTS/STEPS	STANDARDS	Yes	No
28. Install the pedestal to the mounting flange. **(C)** **(S)**	Mounting flange bolts installed and torqued in a sequential pattern.	❑	❑
29. Replace the motor flange lip seals. **(C)** **(S)**	Inspects new lip seal for rips or damage	❑	❑
	Lip is facing toward the housing after installation	❑	❑
30. Match mark the gear reducer housing and cover. **(S)**	Marker or punch used to make alignment ID	❑	❑
31. Remove the gear reducer cover. **(S)**	Cover bolts removed.	❑	❑
32. Replace the housing and cover lip seals. **(S)**	Inspects new lip seal for rips or damage	❑	❑
	Lip is facing toward the housing after installation	❑	❑
33. Bag and tag the agitator components	Components identified and placed in bags/containers	❑	❑
34. Disassemble the output shaft, bearings, and shims. **(S)**	Used arbor press on the shaft bearing following appropriate safety precautions:	❑	❑
	safety glasses/face shield/gloves.	❑	❑
	proper placement of pusher.	❑	❑
	Protected the pressed surface.		
35. Disassemble the input pinion gear, input bearing, and shaft retaining ring/bearing. **(S)**	Used arbor press on the bearings following appropriate safety precautions:	❑	❑
	safety glasses/face shield/gloves.	❑	❑
	proper placement of pusher.	❑	❑
	Protected the pressed surface.		
36. Inspect the input/output gear teeth for surface defects. **(S)**	Visually inspects the teeth for galling, wear, burrs, and cracks.	❑	❑

ELEMENTS/STEPS	STANDARDS	Yes	No
37. Measure the bearing surface of the output shaft. **(S)**	Two measurements with micrometer/caliper taken on shaft bearing surface at 90° apart.	❑	❑
	Bearing housing ID measured with snap gauge and micrometer.	❑	❑
	Demonstrated the proper use/care of precision measuring tools.	❑	❑
	Documented measurement results.	❑	❑
38. Measure the bearing surface of the input pinion gear. **(S)**	Two measurements with micrometer/caliper taken on shaft bearing surface at 90° apart.	❑	❑
	Bearing housing ID measured with snap gauge and micrometer.	❑	❑
	Demonstrated the proper use/care of precision measuring tools.	❑	❑
	Documented measurement results.	❑	❑
39. Measure the bearing surface of the cover and housing. **(S)**	Two measurements with micrometer/caliper taken on shaft bearing surface at 90° apart.	❑	❑
	Bearing housing ID measured with snap gauge and micrometer.	❑	❑
	Demonstrated the proper use/care of precision measuring tools.	❑	❑
	Documented measurement results.	❑	❑
40. Install new bearings to the output shaft. **(C)** **(S)**	Used arbor press on the shaft bearing following appropriate safety precautions:	❑	❑
	safety glasses/face shield/gloves.	❑	❑
	proper placement of pusher.	❑	❑
	Protected the pressed surface.	❑	❑
41. Install a new bearing to the input pinion gear shaft. **(C)** **(S)**	Used arbor press on the shaft bearing following appropriate safety precautions:	❑	❑
	safety glasses/face shield/gloves.	❑	❑
	proper placement of pusher.	❑	❑
	Protected the pressed surface.	❑	❑

ELEMENTS/STEPS	STANDARDS	Yes	No
42. Install the retainer and retainer ring to the input pinion gear shaft. **(C)** **(S)**	Retainer installed and locked in place	❑	❑
43. Install output assembly and shims to the reducer housing. **(C)** **(S)**	Output assembly installed from the top of the reducer housing.	❑	❑
44. Install the input pinion gear assembly to the reducer housing **(S)**	Input pinion gear assmebly installed from the side of the reducer housing.	❑	❑
45. Install the reducer housing cover. **(S)**	Housing cover bolts installed and torqued in a sequential pattern	❑	❑
46. Adjust the gear teeth backlash. **(S)**	Installed dial indicator on either the pinion or bull gear teeth.	❑	❑
	Locked (from rotation) either the low speed shaft or pinion shaft. (depends on where the indicator is mounted)	❑	❑
	Shims added or subtracted to obtain .006” - .007” backlash.	❑	❑
47. Install the gear reducer to the pedestal. **(S)**	Pedestal mounting bolts installed and torqued in a sequential pattern.	❑	❑
48. Install the shaft to the mounting flange and gear reducer. **(C)** **(S)**	Shaft installed to the mounting flange.	❑	❑
	Mounting flange bolts installed and torqued in a sequential pattern.	❑	❑

ELEMENTS/STEPS	STANDARDS	Yes	No
49. Fill the reducer oil reservoir with the proper amount of lubricant. **(S)**	Installed the housing drain plug.	❑	❑
	Connected the oiler piping.	❑	❑
	Lubricating oil filled to the full level mark.	❑	❑
	Filled oil reservoir without excessive spillage.	❑	❑
		❑	❑
	Installed the oil reservoir level device and sight glass.	❑	❑
	Filled sight glass with oil.	❑	❑
	Cleaned any excess oil within the fill area.		
50. Transport the agitator components to the field. **(C)** **(S)**	Rigging attached to the assembly (if required).	❑	❑
		❑	❑
	Shackle(s) attached to lifting equipment (if required).	❑	❑
	Assembly safely transported by crane/truck/wagon.		
51. Install the propeller to the shaft. **(C)** **(S)**	Distance between the propeller and shaft end established.	❑	❑
		❑	❑
	Shaft key installed and locked on shaft.		
52. Install the agitator mounting flange to the sump foundation. **(C)** **(S)**	Mounting flange bolts installed and torqued in a sequential pattern.	❑	❑
53. Install motor to gear reducer. **(C)** **(S)**	Connected the flanges to the sleeve.	❑	❑
	Installed flange and sleeve assembly.	❑	❑
	Aligned coupling halves match mark.	❑	❑
	Installed hub bolts to coupling flange.	❑	❑
54. Install pedestal guard. **(C)** **(S)**	Secured guard over coupling.	❑	❑
	Bolts torqued in a sequential pattern.		
55. Unlock switch gear. **(C)** **(S)**	Switch gear unlocked.	❑	❑

ELEMENTS/STEPS	STANDARDS	Yes	No
56. Notify operations to perform an equipment check. **(C)** **(S)**	Operations notified.	❑	❑
57. Clean the agitator work area. **(S)**	Removed from the area:		
	waste oil/grease	❑	❑
	rags/wipes	❑	❑
	spare or replaced parts	❑	❑
	tools/equipment	❑	❑
58. Document the results of this work task into databases in accordance with the general documenation procedure doc-100.	Database was updated with the results of the work.	❑	❑
	General Documenation procedure DOC-100 was used.	❑	❑
59. Sign off Safe Work Permit. **(C)** **(S)**	Procedure LCC 1013 followed for closing out the Safe Work Permit.	❑	❑

COMMENTS

Trainee: _____

_____

_____

_____

_____

_____

_____

_____

Examiner: _____

_____

_____

_____

_____

_____

_____

Signature: _____ **Date:** _____
(Examiner)

_____ **Date:** _____
(Monitor)

_____ **Date:** _____
(Trainee)

AG-CHM01.SK
March 24, 2011
Revision 0